

L Number	Hits	Search Text	DB	Time stamp
1	2	(back adj oxidation) same (oxygen with chlorine)	USPAT; US-PGPUB	2004/06/21 13:13
2	144	(oxidation with oxide) same (oxygen with chlorine)	USPAT; US-PGPUB	2004/06/21 13:14
3	48	((oxidation with oxide) same (oxygen with chlorine)) and gate	USPAT; US-PGPUB	2004/06/21 13:14
4	10	((oxidation with oxide) same (oxygen with chlorine)) and gate) and silicide and polysilicon	USPAT; US-PGPUB	2004/06/21 13:14
5	9	((oxidation with oxide) same (oxygen with chlorine)) and gate) and silicide and polysilicon) and @ad<20021031	USPAT; US-PGPUB	2004/06/21 13:14

US-PAT-NO: 6660587

DOCUMENT-IDENTIFIER: US 6660587 B2

TITLE: Method for forming a gate electrode
in a semiconductor
device

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Abstract Text - ABTX (1):

A semiconductor device and method of production are disclosed, the method including forming a preliminary gate electrode on a semiconductor substrate, the preliminary gate electrode including a gate oxide layer pattern and a conductive layer pattern stacked on the gate oxide layer pattern, and performing a re-oxidation process for curing damage of the semiconductor substrate and/or a sidewall of the conductive layer pattern, when the preliminary gate electrode is formed by forming an oxide layer on an outer surface of the preliminary gate electrode and on the semiconductor substrate, by supplying an oxygen gas and a chlorine-including gas while restraining a thickness of the gate oxide layer pattern from being increased; and the semiconductor device comprising a preliminary gate electrode formed on a semiconductor substrate, the preliminary gate electrode including a gate oxide layer pattern and a conductive layer pattern stacked on the gate oxide layer pattern, and a re-oxidized semiconductor substrate and/or a sidewall of the conductive layer pattern, with damage cured therein by supplying an oxygen gas and a chlorine-including gas while restraining a thickness of the gate oxide layer pattern from being increased.

Brief Summary Text - BSTX (9) :

To achieve the first preferred embodiments of present invention, a preliminary gate electrode including a gate oxide layer pattern and a conductive layer pattern stacked on the gate oxide layer pattern is formed on a semiconductor substrate. A re-oxidation process is performed for forming the gate electrode by forming an oxide layer on an outer surface of the preliminary gate electrode and the semiconductor substrate, and supplying an oxygen gas and a chlorine-including gas into a reactor while restraining a thickness of the gate oxide layer pattern from being increased.

Brief Summary Text - BSTX (10) :

To achieve the second preferred embodiments of the present invention, a preliminary cell gate electrode is formed on a semiconductor substrate. The preliminary cell gate electrode includes a tunnel oxide layer pattern, a first conductive layer pattern stacked on the tunnel oxide layer pattern, a dielectric interlayer pattern stacked on the first conductive layer pattern, and a second conductive layer pattern stacked on the dielectric interlayer. A re-oxidation process is performed for forming an oxide layer on an outer surface of the preliminary cell gate electrode and on the semiconductor substrate by supplying an oxygen gas and a chlorine-including gas while restraining a thickness of the tunnel oxide layer pattern and the dielectric interlayer pattern from being increased.

Brief Summary Text - BSTX (11) :

According to another preferred embodiment of the present invention, a stacked structure of a tunnel oxide layer pattern, a first

silicon layer pattern for a floating gate, and a nitride layer pattern are formed on a semiconductor substrate. A trench is formed by etching the semiconductor substrate using the stacked structure as an etching mask. A field oxide layer is formed for burying the trench. A dielectric interlayer and a second silicon layer for a control gate are sequentially formed on the first silicon layer pattern. A preliminary cell gate electrode having a stacked structure of the tunnel oxide layer pattern, the first silicon layer pattern, a floating gate pattern, an dielectric interlayer pattern, and the second silicon layer pattern, is formed by etching predetermined portions of the control gate and the dielectric interlayer. A re-oxidation process is performed for forming an oxide layer on an outer surface of the preliminary cell gate electrode and on the semiconductor substrate by supplying an oxygen gas and a chlorine-including gas onto the semiconductor substrate, including the cell gate electrode, while restraining a thickness of the tunnel oxide layer pattern and the dielectric interlayer pattern from being increased.

Brief Summary Text - BSTX (12) :

Since the oxygen gas and the chlorine-including gas are used for the re-oxidation process, the thickness of the gate oxide layer pattern can be restrained from being increased so that the thickness difference of the gate oxide layer pattern in each gate electrode can be reduced.

Detailed Description Text - DETX (2) :

Disclosed is a method for forming a gate electrode, capable of restraining a thickness of a gate oxide layer pattern from being increased when a re-oxidation process is carried out for forming the gate